What is claimed is:

1. An active hybrid transformer circuit for use in bi-directional metallic cable communication to separate a transmit (TX) signal and a receive signal (RX), comprising:

a current driver for the transmit signal;

a load resistor connected to the current driver;

a replica driver; and

a replica resistor connected between the load resistor and the replica driver;

a first point of connection between the replica resistor and the load resistor being connected to a transmission path circuit;

a second point of connection between the replica driver and the replica resistor being connected to a receive side.

2. An active hybrid transformer circuit as claimed in claim 1, wherein a current ratio between the current driver and the replica driver is represented by a complex number.

3. An active hybrid transformer circuit as claimed in claim 2, wherein the complex number has a real part and an imaginary part, at least one of the real part and the imaginary part being variable.

4. An active hybrid transformer circuit as claimed in claim 1, wherein the current ratio is given by:

$$-(R_D//Z_L) / (R_D//Z_L + R_{REP}),$$

where R_D is representative of a resistance value of the load resistor; R_{REP}, a resistance value of the replica resistor; and Z_L, an impedance seen from a transmitter/ receiver to the transmission path circuit.

5. An active hybrid transformer circuit as claimed in claim 4, wherein the current ratio is represented by the complex number which has a real part and an imaginary part, at least one of the real part and the

imaginary part being variable.

6. An active hybrid transformer circuit as claimed in claim 1, further comprising:

a circuit element which includes at least one of a capacitor, an inductor, and a resistor and which is connected in parallel with the replica driver.

7. An active hybrid transformer circuit as claimed in claim 6, wherein the circuit element is variable.

8. An active hybrid transformer circuit as claimed in claim 4, wherein the replica driver comprises:

a digital filter circuit which varies at least one of the real part and the imaginary part and which has an impedance circuit.

9. An active hybrid transformer circuit as claimed in claim 8, wherein a real part and an imaginary part of an impedance in the impedance circuit are equal to those of the impedance Z_L, respectively.

10. An active hybrid transformer circuit as claimed in claim 1, wherein the current driver and the replica driver are implemented by a DAC (digital-to-analog converter) of a current output type.

11. An active hybrid transformer circuit as claimed in claim 1, wherein the replica driver is a digital to analog converter connected to a digital filter trained by a training signal.

12. An active hybrid transformer circuit for use in bi-directional metallic cable communication to separate a transmit (TX) signal and a receive signal (RX), comprising:

a current driver for the transmit signal;

a load resistor connected to the current driver;

a replica driver; and

a replica impedance connected between the load resistor and the replica driver;

a first point of connection between the replica impedance and the load resistor being connected to a transmission path circuit;

a second point of connection between the replica driver and the replica impedance being connected to a receive side.

13. An active hybrid transformer circuit as claimed in claim 12, wherein the current ratio α has only a real part and the replica impedance Z_{REP} is given by:

$$Z_{REP} = ((1 / \alpha) - 1) (R_D // Z_L),$$

where R_D is representative of a resistance value of the load resistor; and Z_L, an impedance seen from a transmitter/ receiver to the transmission path circuit.